

REMARKS

Claims 1-25 are all the claims pending in the application.

Reconsideration and review of the claims on the merits are respectfully requested.

Election/Restrictions

Applicants appreciate that the Examiner has acknowledged Applicants' election without traverse of Invention I, species I, claims 1-5, 20, 25.

Claims 6-19, 21-24, are withdrawn by the Examiner from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention.

Claim Objections

Claims 1-5, 20, 25 are objected to because of the following informalities: "A anode" should instead be "An anode".

Applicants respond by amending claims 1 and 5 to recite "an anode" as the Examiner suggests. Claims 20 and 25 do not contain such informality. Accordingly, Applicants request reconsideration and withdrawal of the objection.

Claim Rejections Under 35 U.S.C. § 112

Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as assertedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The Examiner states that claim 25 does not further limit

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claim 20 from which the claim depends from because “whereby a lithium secondary cell according to claim 1 is manufactured” is not a method step. Therefore this claim is not in the method claim format.

Applicants respond as follows. Claim 25 is amended to clarify the method claim format.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 112, second paragraph.

Claim Rejections - 35 USC § 102

Claim 5 is rejected under 35 U.S.C. 102(b) as assertedly being anticipated by Furukawa et al. (5,112,704) or Kawai (JP 7-302617, abstract) for the reasons given in the Office Action.

The Examiner asserts that Furukawa et al teaches a cell comprising a negative electrode comprising lithium or an alloy of lithium as the active material and an electrolyte comprising LiCF_3SO_3 solute, that when this type of cell is stored for a long period, a reaction occurs between fluorine ionized from lithium active material of the negative electrode, and, as a result, a layer of lithium fluoride which is a passive substance is formed on the negative electrode surface.

The Examiner asserts that Kawai teaches a battery comprising a positive electrode, a negative electrode made of at least one of a lithium alloy and has on its surface a film containing lithium fluoride.

Applicants respectfully traverse the rejection.

Neither Furukawa nor Kawai anticipates each and every requirement of Applicants' independent Claim 5. Neither Furukawa nor Kawai discloses or teaches the requirement of the

present invention for a *multilayered alternating laminated structure* of a lithium layer and a metal fluoride substance layer. If these references are maintained in the anticipation rejection, Applicants kindly ask the Examiner to specifically point out such support in the references.

Furthermore, Furukawa actually teaches against realizing any benefit from a layer of lithium fluoride formed on the negative electrode surface as the object of Furukawa's invention is to indirectly stem the formation of ionized fluorine from lithium trifluoromethanesulfonate in order to prevent the increase in internal resistance of the electrode (See Furukawa, col. 1, lines 35-46 and col. 2, lines 8-14).

Also, Kawai teaches that the surface of the negative electrode is reacted with water, then reacted with hydrogen fluoride according to a known faulty process. The present invention provides benefits of overcoming Kawai's faulty process. The Examiner is kindly directed, for example, to the bridging paragraph of pages 2-3 which describes faults with lithium fluoride covering films which make use of a reaction with water at an electrode boundary, including a tendency for components from sub-reactions intruding into the covering film. There is also a problem with safety because of an abnormal reaction with water or hydrogen fluoride or the like. If the reaction is insufficient, there will be a residue of an unwanted covering film other than the fluoride, leading to an adverse effect, such as a reduction in ion conductivity.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under 35 U.S.C. § 102(b).

Claim Rejections – 35 U.S.C. § 102 or § 103

Claims 1-4, 20, 25 are rejected under 35 U.S.C. 102(b) as assertedly anticipated by or, in the alternative, under 35 U.S.C. 103(a) as assertedly obvious over Furukawa et al. (5,112,704) or Kawai (JP 7-302617, abstract) for the reasons given in the Office Action.

The Examiner asserts that in the event any differences can be shown for the product of the product by process claim 1, as opposed to the product taught by Furukawa et al. or Kawai, such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results.

Applicants respectfully traverse the rejection.

In addition to the argument for traversal presented above in the previous rejection under 35 U.S.C. § 102(b) of Claim 5, Applicants further respond as follows.

Neither Furukawa nor Kawai anticipates or makes obvious therefrom each and every requirement of at least Applicants' independent Claim 1.

Applicants point out that the present invention has at least the following unexpected benefits from its manufacture by a vacuum film growth method. In accordance with the product by process requirement of the present invention, because a layer (lithium layer) made of metallic lithium or an alloy thereof is formed as a film in a vacuum, there is no lithium hydroxide or lithium oxide film or the like on the surface thereof, as occurred in the past. Additionally, because a metal fluoride layer is formed on the lithium layer without losing the vacuum condition, good amorphous properties are achieved, and an anode is obtained which has covering film made of a metal fluoride. As a result of growing a uniform metal fluoride layer by vacuum

film growth method, a lithium secondary cell according to the present invention has improved suppression of dendrite formation and growth and improved cycle life compared to the case of the past in which a metal fluoride layer is grown by means of a chemical reaction of the surface covering film. With the present invention, because a take-up type vacuum deposition apparatus is used to form an anode on a collector while maintaining the vacuum condition, not only is the process simpler than the case of using a chemical reaction as done in the past, but also there is a reduction in the time required to fabricate the lithium secondary cell (See paragraph bridging pages 10-11).

The Examiner has not given proper reference to where either reference discloses, teaches, or suggests the product by process requirement of the present invention wherein said lithium layer and said metal fluoride layer are formed by a vacuum film growth method. If these references are maintained in this rejection, Applicants kindly ask the Examiner to point out such support or motivation in the references.

Claims 2-4, 20 and 25 depend upon or are based on the subject matter of independent Claim 1 and are patentable for at least the same reasons as given for the patentability of Claim 1 above.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection under either 35 U.S.C. § 102(b) or 35 U.S.C. § 103(a).

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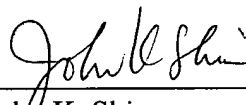
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Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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